should be addressed Observatory of Año Nuevo, Ministry of the Marine, Buenos Ayres.

The observatory of the island of Año Nuevo, as well as the one soon to be established at Bahia Blanca, will form a part of the proposed network of observatories on the Atlantic coast of the Argentine Republic, under the direction of the Ministry of the Marine.

A NEW SUGGESTION FOR THERMOMETERS.

Mr. Charles F. Talman, United States Weather Bureau, contributes the following extracts from two papers recently published in the Atti della Reale Accademia dei Lincei,[1] by Prof. G. Guglielmo, of the University of Cagliari, describing a new method of mixing liquids contained in closed receptacles.

In the study of thermic phenomena it is often desired to render uniform the temperature of a liquid by mixing. It often happens, however, that the liquid is inclosed in a receptacle, and the usual methods of agitating liquids are not applicable. In this case the most obvious expedient is to inclose in the receptacle, with the liquid, a mill or movable system containing iron or small magnets, and to cause the mill to rotate or the movable system to oscillate by means of magnetic or electromagnetic action. * * *

The use of the preceding method requires a construction and a preparation more or less complex; nor is there excluded the possibility of an injury which would render the mechanism inactive, without this fact appearing externally, and, lastly, it is hardly applicable if the dimensions of the receptacle containing the liquid are small.

An active agitation can be produced in all cases with perfect certainty, if, before closing the receptacle, there be fixed on its inner walls laminæ (palette) of convenient number, position, and inclination, and if the receptacle, after being closed, is given a movement of rotation in opposite directions alternately on any axis.

If the receptacle, being, for example, cylindrical, had a smooth wall and were made to rotate about its axis, the liquid would at first remain almost completely motionless, and later, as a result of internal friction, the rotary motion would be communicated from the wall toward the axis; this movement of the liquid would, however, be regular and would not produce any mixing of the various parts.

If on the other hand, the inner wall of the receptacle is provided with laminæ, these, at the beginning of the rotation, impinge upon the motionless liquid, and communicate to certain parts of it various velocities and pressures in various directions, as a result of which, as well as of centrifugal force, there is produced a mixture with those portions which are still motionless, or whose motion is not identical. The effect is almost the same as if the laminæ were in a motionless receptacle and were fixed to an axis issuing externally.

If the rotation continued indefinitely, all parts of the liquid would finally acquire the same angular velocity, viz, that of the receptacle, and would move as a solid without appreciable mixing of the parts: if, however, we stop the rotation of the receptacle abruptly the liquid continues to rotate, certain parts of it pass without hinderance between the laminæ, others, striking the laminæ, change direction, and the desired mixing is thus produced. Then, by producing a rotation in the opposite direction, the phenomena, already described, are reproduced, etc.

As to the form, number, position, and inclination of the laminæ, it seems to me useful that they should be small and numerous, that they should extend or be placed near the axis of rotation, and, perhaps, also that they should be perforated. It seems advisable, also, that they should be inclined at an angle of, say, 45° to the axis and to the direction of motion in order to give to the liquid a movement parallel to the axis as well as a movement of rotation.

* * * * * * *

The above arrangement for agitating a liquid * * * certainly appears useful for thermometers, especially if they have large bulbs and are very sensitive, and particularly if the internal liquid is other than mercury, and hence a poor conductor of heat.

[1] Vol. XI, Fas. 11, and Vol. XII, Fas. 6, dated, respectively, December 7, 1902, and March 15, 1903.

CORRIGENDA.

In MONTHLY WEATHER REVIEW for October, 1903, p. 478, first column, twelfth line, for 12° 35′ read 120° 35′.

THE WEATHER OF THE MONTH.

By Mr. W. B. STOCKMAN, District Forecaster, in charge of Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart IV and the average values and departures from normal are shown in Tables I and VI.

An area of high mean monthly barometric pressure overlay the country from the middle and northern Plateau regions southeastward to the Gulf of Mexico and the south Atlantic coast, with several crests, the principal one overlying the Ohio Valley and Tennessee, extreme northern Louisiana, and eastern and southwestern Arkansas, with mean values ranging from 30.15 to 30.18 inches.

Two areas of low mean pressure obtained, one over southeastern California and southwestern Arizona, the other and principal one, both with regard to area embraced and lowness of readings, over the north Pacific coast district, where a minimum mean of 29.85 inches was reported.

The mean pressure was below the normal in New England, eastern part of the Middle Atlantic States, along the coast of the South Atlantic States, and over Florida; also in southwestern Arizona, eastern California, and the middle and northern Pacific districts; elsewhere it was above the normal.

Over western Tennessee, the Ohio Valley, New Mexico, Colorado, Kansas, northern Missouri, the upper Mississippi and Missouri valleys, eastern and central Montana, and central Wyoming the departures ranged from +0.05 to +0.08 inch. Over the middle and north Pacific coast districts the departures ranged from —0.05 to —0.13 inch, the greatest departures being reported from the coasts of Washington and northwestern Oregon.

The mean pressure decreased from that of October in northern and eastern New England, and in the north and middle Pacific districts, and in portions of the middle and northern Plateau regions; elsewhere the pressure increased over that of the preceding month, the greatest changes, +0.10 to +0.12 inch, being reported from northwestern Minnesota, northern South Dakota, North Dakota, and northeastern Montana. Over Oregon and Washington, increasing from east to west, the decreases ranged from —0.05 to —0.18 inch, the greatest change being reported from Tatoosh Island.

TEMPERATURE OF THE AIR.

The distribution of maximum, minimum, and average surface temperatures is graphically shown by the lines on Chart VI.

Eastward of a line drawn from eastern Minnesota to eastern Texas, and also in the western portions of the Dakotas, Montana, eastern and extreme western Washington, and north-

central California the mean temperature was below the normal, and above the normal in the remaining districts. Generally in the Atlantic States, northern portion of the east Gulf States, Ohio Valley and Tennessee, lower Lake region, and central Montana the departures ranged from —2.0° to —4.5° per day, the greatest departures occurring over western West Virginia and eastern Kentucky.

From southwestern Nebraska and the western parts of Kansas and Texas westward and northwestward to the western portions of the middle and southern Plateau regions, and over southern Oregon and extreme northwestern and southern California the average daily departures ranged from +2.0° to +5.9°, the greatest departures being reported from north-central New Mexico, southern Idaho, and southern California.

By geographic districts the mean temperature was normal in the Missouri Valley and northern slope district, above the normal in North Dakota, the middle and southern slopes, and the Plateau and Pacific regions; elsewhere it was below the normal. The departures averaged +2.0° or more per day in the southern and middle Plateau and south Pacific districts, and —2.0° or more per day in the Atlantic and east Gulf States and the Ohio Valley and Tennessee.

The isotherm of 70° of mean temperature crossed Florida at about the same latitude that the isotherm of 75° did in November, 1902, and 60° slightly to the southward of the position occupied by 65°. Eastward of the one hundred and tenth meridian the isotherms of mean temperature for November, 1903, generally lay considerably to the southward of their positions in November, 1902.

The average temperatures for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	37.6	— 2.3	+ 3.9	+ 0.4
Middle Atlantic	12	41.9	— 2.8	+ 5.9	+ 0.5
South Atlantic	10	51.4	— 2.6	+ 1.1	+ 0.1
Florida Peninsula*	8	64.9	— 1.7	+ 3.4	+ 0.3
East Gulf	9	53.9	— 2.0	— 9.7	— 0.9
West Gulf	7	56.1	— 0.3	—12.1	— 1.1
Ohio Valley and Tennessee	11	42.1	— 3.1	+ 1.8	+ 0.2
Lower Lake	8	37.2	— 1.9	+ 9.0	+ 0.8
Upper Lake	10	32.7	— 0.8	+12.3	+ 1.1
North Dakota*	8	25.4	+ 1.8	+ 3.1	+ 0.3
Upper Mississippi Valley	11	36.4	— 0.9	+ 5.0	+ 0.5
Missouri Valley	11	36.9	0.0	+ 2.0	+ 0.2
Northern Slope	7	32.7	0.0	+ 0.2	0.0
Middle Slope	6	42.4	+ 1.1	— 4.1	— 0.4
Southern Slope*	6	49.5	+ 0.4	—10.1	— 0.9
Southern Plateau*	13	49.5	+ 2.9	— 9.8	— 0.9
Middle Plateau*	8	39.3	+ 2.2	—19.4	— 1.8
Northern Plateau*	12	37.1	+ 0.6	+ 2.8	+ 0.3
North Pacific	7	46.0	+ 0.6	— 1.2	— 0.1
Middle Pacific	5	54.5	+ 1.0	— 3.7	— 0.3
South Pacific	4	60.1	+ 2.6	— 0.7	— 0.1

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Prof. R. F. Stupart says:

The mean temperature of the first ten days of November was above the average in all parts of Canada, and several days were phenomenally warm. On the 11th, however, hard freezing occurred in the Territories, and wintry conditions continued until the close of the month. It was not until the 18th, however, that a pronounced change occurred in Ontario, and several days later in the Maritime Provinces. The largest positive departures from average, about 3°, occurred in Saskatchewan and parts of Nova Scotia, and the largest negative, also about 3°, in southern Alberta and southwestern Ontario.

Maximum temperatures of 90°, or slightly higher, occurred over a small area, extending from southwestern Oklahoma southwestward to southeastern New Mexico, and in the lower Rio Grande Valley. The isotherm of 80° of maximum temperature is located somewhat to the southward of the position it occupied in November, 1902.

At Eastport, Me., New Haven, Conn., Elkins, W. Va., Fort Worth, Tex., Moorhead, Minn., Bismarck, N. Dak., Boise, Idaho, and Baker City, Oreg., the maximum temperature equaled the highest recorded for November since the establishment of the stations; at Albany, N. Y., Port Huron and Detroit, Mich., Green Bay, Wis., and Spokane, Wash., it was 1° higher; at Roseburg, Oreg., and Seattle, Wash., 2° higher; Havre, Mont., and Escanaba and Alpena, Mich., 3° higher; Marquette, Mich., Tacoma, Wash., and Grand Junction, Colo., 5° higher, and 8° higher at Duluth, Minn.

The isotherms of freezing temperature extended to south-central Florida, in Texas to about latitude 29°, to southwestern Arizona, and closely approached the coast in the Pacific States. The isotherms of minimum temperature, as a rule, lay considerably to the southward of their positions in November, 1902.

At Charlotte, N. C., Vicksburg, Miss., and Pensacola, Fla., the minimum equaled the lowest recorded in November since the establishment of stations; at Key West, Fla., Augusta, Ga., and Hatteras, N. C., it was 1° lower; at Tampa, Fla., and Charleston, S. C., 2° lower; at Elkins, W, Va., and Fort Worth, Tex., 3° lower; 4° lower at Binghamton, N. Y., and 6° lower at Jupiter, Fla.

PRECIPITATION.

The distribution of total monthly precipitation is shown on Chart III.

In northern and western Florida, northeast-central and southern Georgia, central Kansas, eastern Nebraska, extreme western Iowa, southeastern Wyoming, central upper Michigan, western Montana, Idaho, except the extreme southeastern portion, northwestern Utah, northern Nevada, and the middle and north Pacific districts the precipitation was above the normal, and below the normal in the remaining districts.

At Pensacola the monthly amount was 7.7 inches above the normal; and more than 3.0 inches above in the western portions of Washington and Oregon, and northwestern California, with departures of +5.4 inches in southwestern Oregon and northwestern California.

Departures of —2.0 inches, or more, from the normal were reported generally from the New England and eastern Middle Atlantic States, southwestern lower Michigan, Indiana, eastern and southern Illinois, the western portions of Kentucky and Tennessee, southern Missouri, the western portion of the east Gulf States, and the eastern portion of the west Gulf States, with the greatest departures, —4.0 to —4.7 inches for the month over southern Arkansas, western Mississippi, Louisiana, and eastern Texas.

By geographic districts the precipitation was normal in the middle Plateau region; above normal in the Florida Peninsula, and northern Plateau and northern and middle Pacific districts, and below normal in the remaining districts. The greatest departures were + 2.9 inches in the middle and +3.5 inches in the northern Pacific districts; and —3.6 inches in the west Gulf States.

The greatest amounts of precipitation, 6 to nearly 22 inches, occurred along the Pacific coast north of central California, and 6 to 10 inches in western Florida and southwestern Georgia. The maximum amount, 21.7 inches, was reported from the extreme northwestern part of California.

No precipitation during the month, or but an inappreciable amount, was reported from western Texas, New Mexico, except the extreme northeastern portion, southwestern Colorado, eastern and southern Utah generally, southern Nevada, the southern third of California, except the extreme southwestern portion, and Arizona.

Heavy snowfalls were reported from the northern Rocky Mountain districts during the month, but little of it remained

on the ground at the end. Moderately heavy falls were also reported from the region about the extreme eastern end of Lake Ontario.

Snow occurred as far south as a line drawn from southern South Carolina west-northwest to Nevada and from east-central California north-northwest to the mouth of the Columbia River, but at the end of the month the line of southern limit of snowfall had receded considerably to the northward and the western limit considerably to the eastward.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 5, 18. Arkansas, 11. California, 1, 4, 14, 15. Connecticut, 16. Georgia, 2. Illinois, 11, 16. Indiana, 11, 16. Indian Territory, 1. Iowa, 4. Kansas, 10. Kentucky, 11. Louisiana, 5. Maine, 17. Massachusetts, 16. Michigan, 5, 11. Minnesota, 22. Mississippi, 5, 6, 11. Missouri, 11, 16. Nebraska, 3. New Hampshire, 16, 17. New York, 14, 16, 17. North Carolina, 6, 17, 25. Ohio, 5, 14, 16. Oregon, 4, 7, 9, 11, 12, 13, 14, 15, 16, 18, 19. Pennsylvania, 14, 17. South Carolina, 5. Tennessee, 3, 16, 17. Texas, 4. Utah, 8, 11, 12, 15. Virginia, 5. Washington, 6, 7, 9, 14, 15, 18, 19.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 21, 29. Arkansas, 24, 25. California, 14, 15. Connecticut, 16. Georgia, 21, 25. Idaho, 9, 11. Illinois, 5, 6, 11, 12, 28. Indiana, 10, 11, 14, 16. Iowa, 11, 12, 14, 23, 28. Kansas, 30. Kentucky, 25. Maine, 17, 19, 22, 23, 24. Massachusetts, 5, 6, 16, 23. Michigan, 5, 7, 11, 16, 23. Minnesota, 9, 22. Mississippi, 20. Missouri, 11, 13, 16, 24, 25, 26. Montana, 8, 20, 30. Nevada, 12. New Hampshire, 16. New Jersey, 6. New York, 5, 6, 16, 17, 22, 23, 24. North Carolina, 21, 25, 26. North Dakota, 20, 22, 28. Ohio, 14, 23. Oregon, 14, 15. Pennsylvania, 5, 14. South Carolina, 7, 20, 21, 22, 24, 25, 26. South Dakota, 15, 22, 28, 30. Tennessee, 25. Utah, 8, 11, 12, 13. Vermont, 15, 17, 22, 23. Virginia, 15. Washington, 5, 8, 9, 10, 11, 12, 13, 18, 19, 20, 26. Wisconsin, 5, 11, 12, 15, 16, 23. Wyoming, 11, 13, 14, 15, 16, 23.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	2.19	56	−1.7	−3.7
Middle Atlantic	12	1.51	49	−1.6	+0.9
South Atlantic	10	2.06	72	−0.8	−2.5
Florida Peninsula*	8	2.71	123	+0.5	+3.5
East Gulf	9	2.32	61	−1.5	−5.2
West Gulf	7	0.31	8	−3.6	−3.6
Ohio Valley and Tennessee	11	2.62	72	−1.0	−6.4
Lower Lake	8	1.60	50	−1.6	+0.4
Upper Lake	10	1.71	68	−0.8	0.0
North Dakota*	8	0.29	42	−0.4	−1.8
Upper Mississippi Valley	11	0.75	35	−1.4	+0.2
Missouri Valley	11	0.87	74	−0.3	+3.8
Northern Slope	7	0.42	82	−0.1	+0.5
Middle Slope	6	0.58	59	−0.4	+0.6
Southern Slope*	6	0.12	8	−1.4	−3.6
Southern Plateau*	13	T.	0	−0.6	−0.1
Middle Plateau*	8	0.87	100	0.0	−0.6
Northern Plateau*	12	2.58	154	+0.9	−2.5
North Pacific	7	10.37	151	+3.5	−4.7
Middle Pacific	5	6.18	188	+2.9	−2.5
South Pacific	4	0.29	22	−1.0	−1.2

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Professor Stupart says:

The precipitation was excessive, and chiefly in the form of rain both in British Columbia and the Maritime Provinces, the largest quantity reported being 12.4 inches at New Westminster, B. C., and 7.6 inches at Halifax, N. S. In all the intervening provinces and territories the rainfall was scant and the snowfall not large.

At the close of the month nearly all portions of Ontario, Quebec, and New Brunswick were snow covered, but in only a few districts on the higher lands was the depth sufficient to make good sleighing. Manitoba and the northern portions of the Territories were also covered, as were also parts of Prince Edward Island.

In the Northwest Territories and Manitoba the ice on ponds and small lakes was from 6 to 11 inches in thickness, and in Ontario and Quebec from 3 to 6 inches, and navigation of canals and harbors was hampered.

HUMIDITY.

The relative humidity was normal in the Ohio Valley and Tennessee, the Upper Mississippi and Missouri valleys, and the southern slope and north Pacific districts; below normal in the Atlantic and Gulf States, Lake region, North Dakota, and the southern Plateau region; and above normal in the remaining districts. The deficiency was quite marked in the west Gulf States, and the excess in the northern and middle slope, the middle Plateau, and middle Pacific districts.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	73	− 5	Missouri Valley	71	0
Middle Atlantic	71	− 4	Northern Slope	74	+ 7
South Atlantic	76	− 2	Middle Slope	69	+ 7
Florida Peninsula	81	+ 1	Southern Slope	62	0
East Gulf	74	− 2	Southern Plateau	38	− 5
West Gulf	67	− 7	Middle Plateau	60	+ 8
Ohio Valley and Tennessee	73	0	Northern Plateau	74	+ 4
Lower Lake	74	− 3	North Pacific	85	0
Upper Lake	76	− 4	Middle Pacific	82	+ 7
North Dakota	75	− 4	South Pacific	71	+ 2
Upper Mississippi Valley	74	0			

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographic districts, appear in Table I.

The cloudiness was normal in the southern Plateau region; below in the New England, Middle Atlantic, and Gulf States, Ohio Valley and Tennessee, North Dakota, upper Mississippi Valley, and southern slope region; and above normal in the remaining districts. Except in the northern Plateau and Pacific districts, where they ranged from +1.3 to +2.8, the departures were not marked.

The averages for the various districts, with departures from the normal, are shown in the following table:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.2	− 0.4	Missouri Valley	5.6	+ 0.7
Middle Atlantic	5.0	− 0.2	Northern Slope	5.1	+ 0.5
South Atlantic	4.9	+ 0.4	Middle Slope	4.3	+ 0.7
Florida Peninsula	3.8	− 0.8	Southern Slope	2.7	− 0.5
East Gulf	4.4	− 0.1	Southern Plateau	2.3	0.0
West Gulf	4.3	− 0.3	Middle Plateau	4.3	+ 0.7
Ohio Valley and Tennessee	5.6	− 0.1	Northern Plateau	7.3	+ 1.3
Lower Lake	6.7	− 0.5	North Pacific	8.7	+ 1.9
Upper Lake	6.7	− 0.3	Middle Pacific	6.6	+ 2.8
North Dakota	5.1	− 0.2	South Pacific	4.1	+ 1.2
Upper Mississippi Valley	5.1	− 0.2			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Buffalo, N. Y.	11	62	w.	North Head, Wash.	14	70	sw.
Do.	12	60	w.	Do.	20	60	s.
Carson City, Nev.	11	64	w.	Do.	25	71	se.
Do.	12	58	sw.	Do.	26	57	s.
Do.	13	58	sw.	Point Reyes Light, Cal.	7	75	nw.
Do.	14	60	sw.	Do.	8	55	nw.
Do.	15	60	w.	Do.	9	59	nw.
Cheyenne, Wyo.	8	55	nw.	Do.	10	63	nw.
Do.	11	56	w.	Do.	14	61	s.
Chicago, Ill.	11	55	sw.	Do.	19	56	se.
Do.	12	69	s.	Do.	20	60	s.
Columbus, Ohio.	11	56	sw.	Salt Lake City, Utah.	12	57	nw.
Eastport, Me.	7	52	ne.	Southeast Farallone, Cal.	7	55	nw.
Havana, Cuba.	21	52	e.	Do.	10	52	nw.
Knoxville, Tenn.	17	50	sw.	Tatoosh Island, Wash.	1	66	s.
Mount Tamalpais, Cal.	3	55	sw.	Do.	3	64	e.
Do.	7	56	nw.	Do.	8	62	s.
Do.	8	55	n.	Do.	9	60	s.
Do.	9	65	nw.	Do.	11	68	e.
Do.	10	65	nw.	Do.	13	50	e.
Do.	13	50	sw.	Do.	17	74	e.
Do.	14	57	sw.	Do.	18	78	e.
New York, N. Y.	24	59	nw.	Do.	19	63	e.
North Head, Wash.	1	61	se.	Do.	21	54	s.
Do.	3	53	s.	Do.	25	62	s.
Do.	4	54	se.	Do.	27	50	e.
Do.	5	84	se.	Do.	28	52	e.
Do.	8	90	se.	Winnemucca, Nev.	11	60	sw.
Do.	9	84	se.	Do.	12	57	sw.
Do.	11	72	w.	Do.	14	58	sw.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 894 thunderstorms were received during the current month as against 481 in 1902 and 1770 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 16th, 206; 11, 150; 17, 113.

Reports were most numerous from: Missouri, 109; Ohio, 104; Tennessee, 64.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 1st to 9th.

In Canada: Thunderstorms were reported from Port Stanley, 16. New Westminster, 20. Hamilton, Bermuda, 2, 3.

Auroras were reported from St. Johns, N. F., 18. Grand Manan, 9. Quebec, 9, 20. Montreal, 18. Kingston, 18. White River, 1. Parry Sound, 18. Port Arthur, 1. Minnedosa, 18, 21, 23, 30. Medicine Hat, 18. Swift Current, 18, 21, 30. Edmonton, 1, 8, 21, 22, 23. Prince Albert, 15, 17, 18. Battleford, 17, 18.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. W. B. STOCKMAN, Forecast Official, in charge of Division of Meteorological Records.

Table I gives, for about 137 Weather Bureau stations making two observations daily and for about 31 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,800 stations occupied by voluntary and other cooperating observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station, the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (. . . .).

Table III gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division the average resultant direction for that division can be obtained.

Table IV gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table V gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates per hour (ins.)	3.00	1.80	1.40	1.20	1.08	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table VI gives, for about 30 stations furnished by the Canadian Meteorological Service, Prof. R. F. Stupart, director, the means of pressure and temperature, total precipitation and depth of snowfall, and the respective departures from normal values, except in the case of snowfall.

Table VII gives the heights of rivers referred to zeros of gages; it is prepared by the Forecast Division.

NOTES EXPLANATORY OF THE CHARTS.

Chart I, tracks of centers of high areas, and Chart II, tracks of centers of low areas, are prepared by the Forecast Division. The roman numerals show number and chronological order of highs (Chart I) and lows (Chart II). The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the observations at 8 a. m. and 8 p. m., seventy-fifth meridian time. Within each circle is also given (Chart I) the highest barometric reading and (Chart II) the lowest barometric reading at or near the center at that time, and in both cases as reduced to sea level and standard gravity.

Chart III.—Total precipitation. The scale of shades showing the depth of rainfall is given on the chart itself. For isolated stations the rainfall is given in inches and tenths, when appreciable; otherwise, a "trace" is indicated by a capital T, and no rain at all by 0.0.

Chart IV.—Sea-level pressure and resultant surface winds. The pressures have been reduced to sea level and standard gravity by the method fully described by Prof. Frank H. Bigelow on pages 13–16 of the REVIEW for January, 1902. The pressures have also been further reduced to the mean of the twenty-four hours by the application of a suitable correction, to the mean of the 8 a. m. and 8 p. m. readings, at stations taking two observations daily, and to the 8 a. m. or 8 p. m.